A Stalked Jellyfish *Stenoscyphus inabai* (Kishinouye, 1893) (Stauromedusae), found at The Jawbone, Port Phillip Bay, Victoria

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Abstract
The stauromedusa *Stenoscyphus inabai* is reported from The Jawbone, Port Phillip Bay and comparisons are made with previous observations made in the 1980s at Black Rock, Port Phillip Bay, with comments on habitat and food sources. Analysis is performed on deformity rates and compared with previous deformity rates reported in Stauromedusae. Colour images of this species are published. (*The Victorian Naturalist* **130** (5) 2013, 202-207).

Keywords: Stauromedusa, Jawbone, *Stenoscyphus inabai*

In 1989 Dan McInnes published an interesting Naturalist Note in *The Victorian Naturalist*, (McInnes 1989). His note was about his observations of a Stauromedusa species, identified as *Stenoscyphus inabai* (Kishinouye, 1893), which he collected at Black Rock and observed in great detail over its life cycle, from small juveniles (0.5 mm) in February–April to mature adults (max. 23 mm) from October to December. Dan noted that while smaller specimens had firm, round, tubular stalks, the mature adults flattened like a flat bicycle tube. His specimens were collected from the weed *Cystophora expansa* (Areschoug) Womersley, a species which is seasonal in growth and is entirely absent in December and January, leading Dan to raise the question: how does *S. inabai* survive when its habitat is absent?

I have recently taken an interest in Stauromedusae, having collected two single specimens over the last 10 years. I have corresponded with Claudia Mills at the University of Washington (Mills 2012) and examined the small collection of Stauromedusae available in Museum Victoria. I was therefore delighted when, on 11 April 2012 on a Field Naturalists Club of Victoria (FNCV) Marine Research Group excursion, I collected 11 specimens of *S. inabai* that were living on *Zostera muelleri*, Irmisch ex Ascherson 1867 at The Jawbone, Williamstown. The 11 specimens were of a range of sizes, including juveniles from 3.5 mm to 8 mm, two specimens (15 mm and 17 mm) being mature with visible gonads, and a third specimen of a mature size (15 mm) which did not exhibit developed gonads. Ten of these specimens (Fig. 1) were retained for photography; as the eleventh was damaged, I released it where it was found.

Robert Burn collected a twelfth specimen some 10 metres away, also on *Z. muelleri* (Fig. 1). This was a 20 mm specimen with a much greener colour and a much greater number of anchors and secondary tentacle groups (16 instead of 8) and rows of gonads (8 pairs instead of 4) (Fig. 2 A, B). The presence of this specimen gave rise to discussion that could be resolved only by examination of further material.

Accordingly, on 7 July 2012 a second visit was made to the Jawbone by Robert Burn, Melanie Mackenzie, Leon Altoff and the author, with the intention of finding more of these animals. It was a cold clear sunny day with an excellent low tide, and the Stauromedusae could be seen easily in the shallow still water, attached to *Zostera muelleri* (Figs. 3 and back cover). In total, about 25 specimens were found, almost all adults with gonads. The colour of specimens varied considerably more than in those seen in April and it was agreed that the bright green specimen from April fell within the colour range of the species.

Fifteen specimens (Fig. 4) were selected to be examined more closely. A range of colours was selected, as were the only two juveniles (8 and 9 mm, with no visible gonads) seen and all adult specimens (14–24 mm), which appeared to be 'fatter' than normal. Of the 15 specimens, 12 had 8 anchors and tentacle groups, the 9 mm juvenile (Fig. 2 G, H) had 9 anchors (which were very small and difficult to count), and appeared to be recovering from damage with a missing peduncle and a slit down one side of the umbrella. A 22 mm specimen had 10 an-

Fig. 1. *Stenoscyphus inabai* specimens collected in April 2012, NMV F190059–F190063.

chors and tentacle groups (Fig. 2 E, F) and a 20 mm specimen had 12 anchors and tentacle groups (Fig. 2 C, D, Fig. 5).

A final visit to the Jawbone on 4 August 2012, in poor weather, yielded a 12 mm juvenile specimen, which was used for live nematocyst observations.

In total, 38 specimens have been seen and three of them (7.9%) have clearly visible additional anchors and tentacle groups, matched with additional rows of gonads, giving perfect pentamerous, hexamerous and octamerous symmetry.

Zagal (2008) observed that of the 3790 specimens of the stauromedusa *Haliclystus antarcticus* Pfeffer, 1889 [as *Haliclystus auricula* (Rathke, 1806) (Miranda *et al.* 2009)] she examined, 16 specimens (0.4%) exhibited pentamerous or hexamerous symmetry. She has suggested that the cause may be either environmental or due to a lack of genetic diversity in the population.

Interestingly, immediately next to the somewhat sparse beds of *Zostera muelleri,* in slightly deeper water, there were luxuriant beds of *Heterozostera nigricaulis* (Kuo 2005) which seemed to be completely devoid of Stauromedusae.

One final observation from this day was of one specimen of the sessile ctenophore, *Coeloplana willeyi* Abbott, 1902, observed in the field on the same seagrass as the Stauromedusae. A second, partially digested, specimen was found inside the umbrella of one of the Stauromedusae. Also found in the collecting jar were two small crustacean carapaces. This suggests that *C. willeyi,* in addition to small crustaceans, is a potential food source for Stauromedusae.

These animals have all been identified as *S. inabai* (Kishinouye, 1893) and not *Depastromorpha africana* Carlgren, 1935, since all specimens lack the remnant primary tentacle and glandular cushions on the outer tentacles.

Examination of discharged live nematocysts and comparison with the table of undischarged nematocysts published in Zagal *et al.* (2011) is not inconsistent with this identification.

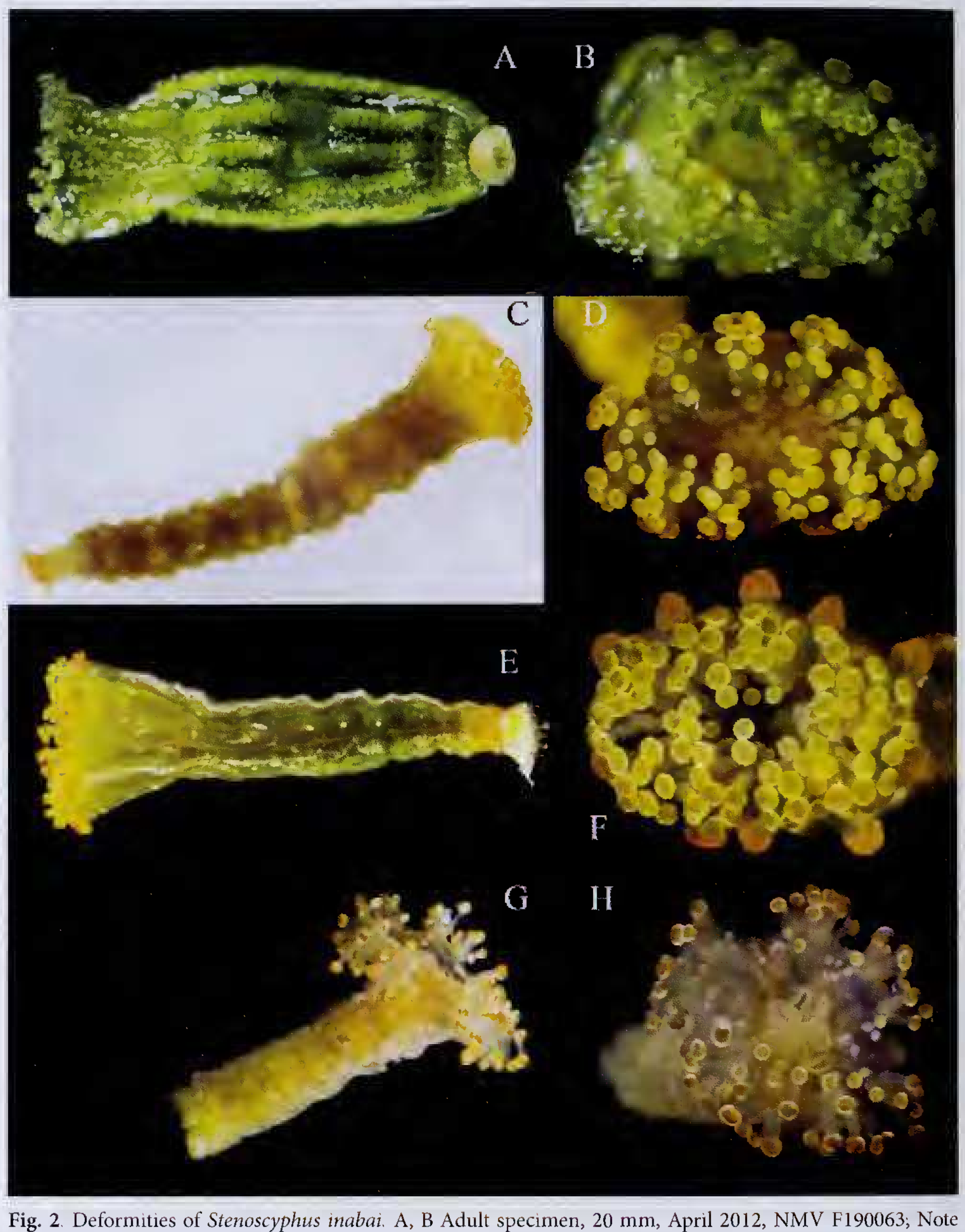

Fig. 2. Deformities of *Stenoscyphus inabai*. A, B Adult specimen, 20 mm, April 2012, NMV F190063; Note octamerous symmetry. C, D Adult specimen, 20 mm, July 2012, NMV F192289; Note hexamerous symmetry. E, F Adult specimen, 22 mm, July 2012, NMV F192289; Note pentamerous symmetry. G, H Juvenile specimen, 9 mm, July 2012, NMV F192289; Note presence of 9 anchors and tentacle clusters, and evidence of damage to bell and missing peduncle.

Fig. 3. Specimen of *Stenoscyphus inabai* in natural habitat on *Zostera muelleri* July 2012.

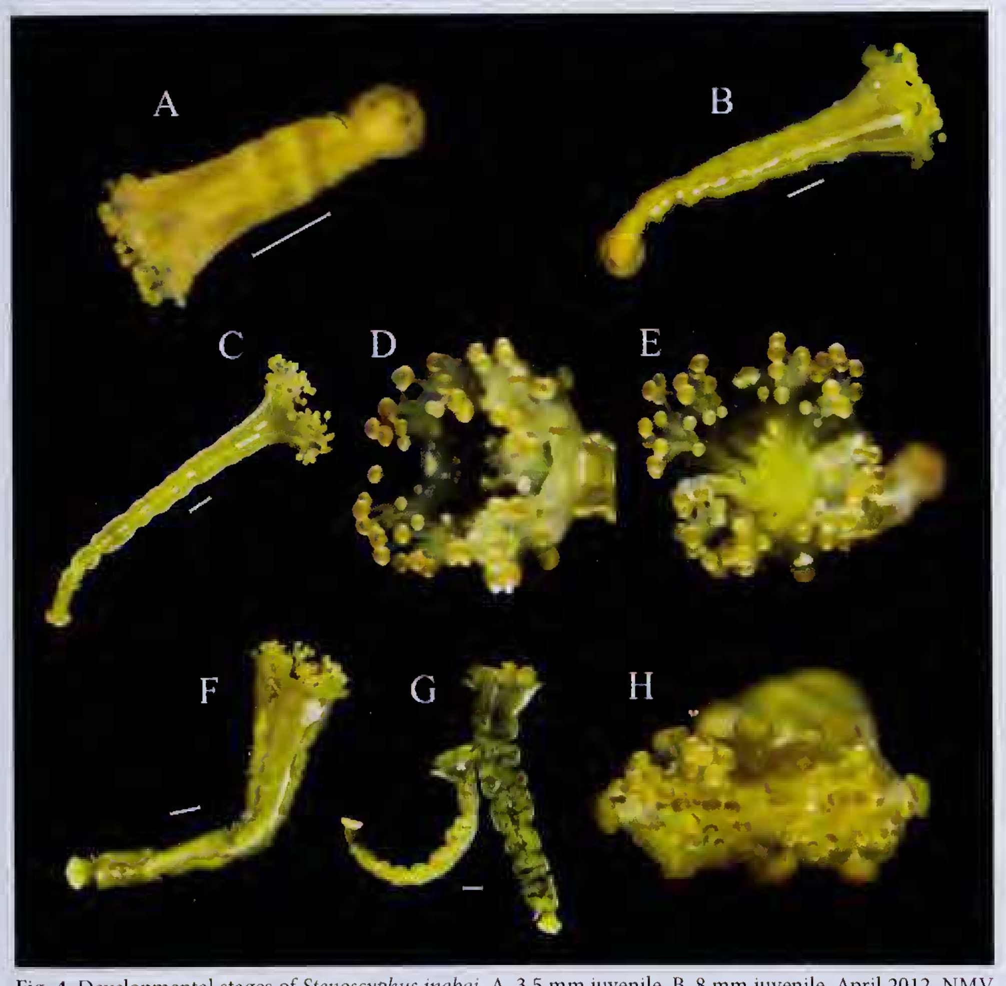

Fig. 4. Developmental stages of *Stenoscyphus inabai*. A. 3.5 mm juvenile. B. 8 mm juvenile, April 2012, NMV F190059. C-E 15 mm sub-adult, April 2012. NMV F190062. C. Whole animal. D. Note nematocyst clusters. E. Note the beginnings of the development of the gonads and how circular the bell is. F-H Adult specimens (15 mm [NMV F190061] and 17 mm [NMV F190060]) with visible gonads and the "deflated bicycle tyre" appearance. Note that 8 anchors are clearly visible. Bar = 1 mm.

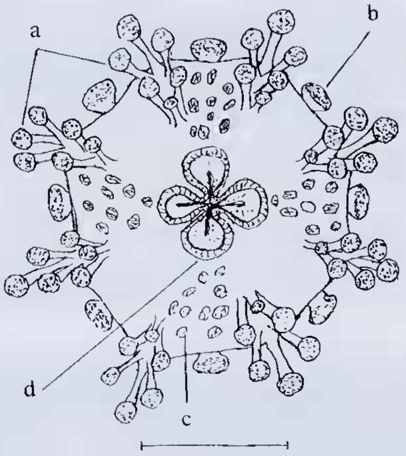

Fig. 5. A view of the subumbrellar or inner side of the bell in an everted position showing a) Secondary tentacles, b) Anchors, c) Nematocyst clusters and d) Four-lobed mouth (bar = 1.0 mm). (Source McInnes (1989: 89).

All specimens collected in April have been photographed in detail and preserved in 96% ethanol to allow for future DNA studies. They have been lodged with Museum Victoria in accordance with the FNCV Marine Research Group's collecting permit, registration numbers NMVF190059–NMVF190063.

The deformed specimens collected in July have been photographed and preserved in 96% ethanol and lodged with the Museum Victoria, registration number NMVF192289.

Dan McInnes' question as to where they go when their habitat is not present still lacks a definite answer. The full life stages of Stauromedusae remain little known and the story of the 'hydropolyp without tentacles', *Microhydrula limopsicola* (Jarms and Tiemann 1996) is instructive (Miranda *et al.* 2010). Specimens of this species, collected on living bivalve shells from the South Shetland Islands on 24 December 1991 and maintained as a live colony ever since (after asexually reproducing and migrating to glass surfaces) were shown to be only a phase of the life cycle of a stauromedusa when DNA analysis was performed and the species synonymised with *Halicystus antarcticus* Pfeffer, 1889 (Miranda *et al.* 2010).

Finally, Kishinouye (1902: 5) notes: 'As the body has adhesive apparatus at both its extremities, it can effect a locomotion very much like that of a leech' (Fig. 3, back cover and Fig. 6).

Fig. 6. Specimen of *Stenoscyphus inabai* exhibiting leech-like movement. (15 mm adult specimen, April 2012, NMV F190061).

I am pleased to present here some live colour images of this species' development, behaviour, habitat and deformities.

Supplementary Note

Subsequent to the completion of this paper, a further specimen was observed and photographed by Trevor McMurrich in November 2012 at Curlewis, Outer Corio Bay, Port Phillip Bay. The specimen was found on the seagrass, *Heterozostera nigricaulis* (Kuo 2005) in 50 cm of water and was relocated to a rock to be photographed. It exhibited a vibrant green shade very similar to the octameric specimen collected in April 2012 at the Jawbone. This specimen exhibited normal symmetry.

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Release or retain? Prioritising biodiversity conservation when deciding the endpoint for Victorian reptiles and frogs removed from the wild for research purposes

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Abstract

One of several possible endpoints for animals removed from the wild for research purposes is to return those animals (or their progeny) to the wild. However, this endpoint involves risks to wild populations that can be damaging, such as behavioural problems or failure to locate suitable resources, or even catastrophic, such as the introduction or spread of pathogens and disease. Whilst the risk of pathogen transfer can be low for any given release, the consequences when it does occur can be extreme. Risks such as transferring novel or emerging pathogens from captivity to wild populations can occur before pathogens are known to occur. This situation occurred with the introduction to Australia of the amphibian disease chytridiomycosis, which probably entered wild populations via infected captive frogs before the pathogen that causes the disease was identified. I argue that reptiles and frogs removed from the wild in Victoria should not be returned to the wild, and discuss some alternative endpoints for these animals. (*The Victorian Naturalist* **130** (5) 2013, 207–211).

Keywords: research, reptiles, frogs, release, retain

Biodiversity is under increasing pressure around the world (Butchart *et al.* 2010), and reptiles (Gibbons *et al.* 2000; Sinervo *et al.* 2010; Böhm *et al.* 2013) and amphibians (McCallum 2007) are conspicuous components of global biodiversity loss. In fact, loss of amphibians due to the disease chytridiomycosis, caused by the Amphibian Chytrid Fungus *Batrachochytrium dendrobatidis*, over the last few decades has been labelled 'the most spectacular loss of vertebrate biodiversity due to disease in recorded history' (Skerratt *et al.* 2007: 125). Protection and restoration of biodiversity is the primary objective of conservation agencies.

Numerous researchers (> 12 in 2012; author's unpublished data) apply to the Victorian Department of Environment and Primary Industries (DEPI) (formerly Department of Sustainability and Environment) each year for a permit to allow them to collect reptiles and/or frogs within Victoria for research purposes. Typically, these applications fall into one of two categories: those for which returning the animals to the wild is an integral component of the experimental design, and those for which there is no research need to return animals to the wild. It is important to distinguish between returning animals to the wild at the conclusion of a **research** project (the subject of this paper), versus the numerous wildlife **management** projects involving animal releases that occur in Victoria and have Management Authorisations under the *Wildlife Act* 1975. These latter projects must meet strict criteria and have appropriate approvals, and the issues addressed in this paper are typically considered and managed during those projects.